We claim:

1. A process for treating and oxidizing biological waste materials comprising disposing an electrolyte in an electrochemical cell, separating the electrolyte into an anolyte portion and a catholyte portion with a hydrogen ion-permeable membrane or porous polymer, ceramic or glass membrane, applying a direct current voltage between the anolyte portion and the catholyte portion, disposing a foraminous basket in the anolyte, placing or pouring the biological waste materials in the basket within the anolyte portion, and oxidizing the biological waste materials in the anolyte portion with a mediated electrochemical oxidation (MEO) process, wherein the anolyte portion further comprises an oxidizing species in aqueous solution and the electrolyte is an acid or neutral aqueous solution.

2. The process of claim 1, wherein each of the oxidizing species has normal valence states and higher valence oxidizing states and further comprising creating the higher valence oxidizing states of the oxidizing species by stripping and reducing electrons off normal valence state species in the electrochemical cell.

3. The process of claim 1, further comprising introducing an ultrasonic energy into the anolyte portion rupturing cell membranes in the biological waste materials by raising local temperature of the cell membranes with the ultrasonic energy to above several thousand degrees and causing cell membrane failure.

4. The process of claim 1, further comprising introducing ultraviolet energy into the anolyte portion and decomposing hydrogen peroxide into free hydroxyl radicals therein and increasing efficiency of the MEO process by recovering energy through the

oxidizing of the biological waste materials in the anolyte portion.

5. The process of claim 1, further comprising using oxidizing species found *in situ* in the process, by converting normal valence state species found *in situ* in solution into higher valence state species and destroying the biological waste materials with the higher valence state species.

6. The process of claim 1, further comprising using oxidizing species, and attacking specific organic molecules with the oxidizing species and preventing the formation of dioxins.

7. The process of claim 1, further comprising interchanging oxidizing species in a preferred embodiment without changing equipment.

8. The process of claim 1, further comprising breaking down biological waste materials into organic compounds and attacking the organic compounds using inorganic free radicals and generating organic free radicals.

9. The process of claim 1, further comprising energizing the electrochemical cell at a potential level approximately equal to ion valence potential or slightly higher.

10. The process of claim 1, further comprising raising normal valence state species to a higher valence state and stripping the normal valence state species of electrons in the electrochemical cell.

11. The process of claim 1, further comprising circulating anions through a converter.

12. The process of claim 1, further comprising contacting anions

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with biological waste materials in the anolyte portion.

13. The process of claim 1, further comprising introducing biological waste materials into the anolyte portion.

14. The process of claim 1, further comprising reducing higher valence state species to normal valence state species and decomposing molecules from oxidizer material.

15. The process of claim 1, further comprising circulating anions through the electrochemical cell.

16. The process of claim 1, further comprising involving increasing the anolyte temperature above 50°C thereby initiating reactions between the mediator and water to form the free radical secondary oxidizing species and hydrogen peroxide.

17. The process of claim 1, further comprising adding an ultraviolet source to the anolyte portion and augmenting secondary oxidation processes, breaking down hydrogen peroxide into free hydroxyl radicals, and increasing oxidation processes.

18. The process of claim 1, characterized in that the process is performed at a temperature between room temperature and slightly below the boiling point of the electrolyte (generally below 100°C).

19. The process of claim 1, wherein the temperature at which the process is performed is varied.

20. The process of claim 1, wherein the oxidizing species is chosen from the group consisting of silver, cerium, cobalt, iron, manganese, ruthenium, and combinations thereof.

21. The process of claim 1, wherein the aqueous solution is chosen from the group consisting of nitric acid, sulfuric acid, phosphoric acid.

22. The process of claim 1, further comprising removing and treating precipitate-forming anions from the biological waste.

23. The process of claim 1, further comprising introducing more than one mediated oxidizing ion into the anolyte portion.

24. The process of claim 1; further comprising regenerating the anolyte portion.

25. An apparatus for treating and oxidizing biological waste materials comprising an electrochemical cell, an electrolyte disposed in the electrochemical cell, a hydrogen ion-permeable membrane or porous polymers, ceramic, or a glass membrane disposed in the electrochemical cell for separating the cell into anolyte and catholyte chambers and separating the electrolyte into anolyte and catholyte portions, electrodes further comprising an anode and a cathode disposed in the electrochemical cell respectively in the anolyte and catholyte chambers and in the anolyte and catholyte portions of the electrolyte, a power supply connected to the anode and the cathode for applying a direct current voltage between the anolyte and the catholyte portions of the electrolyte, a foraminous basket disposed in the anolyte chamber for receiving the biological waste materials, an oxygen source connected to the electrochemical cell for promoting the oxidizing of the biological waste materials in the anolyte portion with a mediated electrochemical oxidation (MEO) process wherein the anolyte portion includes an oxidizing species in aqueous solution and the electrolyte is an acid, alkaline or neutral aqueous solution.

26. The apparatus of claim 25, wherein each of the oxidizing species has normal valence states and higher valence oxidizing states

and wherein the higher valence oxidizing states of the oxidizing species is created by stripping and reducing electrons off normal valence state species in the electrochemical cell.

27. The apparatus of claim 25, further comprising an ultraviolet source connected to the anolyte chamber and decomposing hydrogen peroxide into free hydroxyl radicals therein and increasing efficiency of the MEO process by recovering energy through the oxidizing of the biological waste materials in the anolyte chamber.

28. The apparatus of claim 25, further wherein the oxidizing species are higher valence state species found *in situ* for destroying the biological waste material.

29. The apparatus of claim 25, further comprising organic free radicals for aiding the MEO process and breaking down the biological waste materials into organic compounds.

30. The apparatus of claim 25, wherein the hydrogen ion-permeable membrane or porous polymers, ceramic, or glass membrane comprises a filter for separating the anolyte portion and the catholyte portion.

31. The apparatus of claim 25, wherein the electrochemical cell is energized at a potential level of at least ion valence potential.

32. The apparatus of claim 25, further comprising a converter connected to the anolyte chamber.

33. The apparatus of claim 25, further comprising involving anions with an oxidation potential sufficient to initiate secondary oxidation process as thereby producing additional oxidizers.

34. The apparatus of claim 25, further comprising an ultraviolet source connected to the anolyte for augmenting secondary oxidation processes by breaking down hydrogen peroxide into free hydroxyl

radicals for increasing oxidation processes.

35. The apparatus of claim 25, wherein oxidation and reduction potentials of the oxidizing species are inversely related to pH.

36. The apparatus of claim 25, wherein the oxidizing specie is chosen from the group consisting of silver, cerium, cobalt, iron, manganese, ruthenium, and combinations thereof.

37. The apparatus of claim 25, wherein the aqueous solution is chosen from the group consisting of nitric acid, sulfuric acid, phosphoric acid, and combinations thereof.

39 ~~38.~~ The apparatus of claim 25, further comprising a reaction chamber housing the anolyte portion and the foraminous basket.

40 ~~39.~~ The apparatus of claim ~~38,~~ 39 further comprising a thermal control connected to a reaction chamber for varying the temperature of the anolyte portion.

41 ~~40.~~ The apparatus of claim ~~38,~~ 39 further comprising a condenser connected to the reaction chamber.

38 ~~41.~~ The apparatus of claim 25, further comprising a CO_2 vent for releasing CO_2 atmospherically.

42. The apparatus of claim ~~38,~~ 39 further comprising a lid attached to the reaction chamber allowing insertion of waste into the anolyte portion.

43. The apparatus of claim ~~43,~~ 42 further comprising a lid stop connected to the lid for controlling movement of the lid.

44. The apparatus of claim ~~38,~~ 39 further comprising a filter connected to the reaction chamber.

45. The apparatus of claim ~~38,~~ 39 further comprising an anolyte pump connected to the reaction chamber for circulating the anolyte portion

back to the electrochemical cell.

46. The apparatus of claim 45, further comprising a drain connected to the anolyte pump.

47. The apparatus of claim 46, further comprising a drain valve connected to the drain.

48. The apparatus of claim ~~38~~ 39, further comprising an inorganic compounds removal and treatment system connected to the anolyte pump.

49. The apparatus of claim 25, further comprising a catholyte reservoir connected to the cathode portion of the electrochemical cell.

50. The apparatus of claim 49, further comprising an air sparge connected to the catholyte reservoir for introducing air into the catholyte reservoir.

51. The apparatus of claim 49, further comprising an off gas cleaning system for cleaning gases before release into the atmosphere connected to the catholyte reservoir.

52. The apparatus of claim 51, wherein the off gas cleaning system comprises scrubber/absorption columns.

53. The apparatus of claim 51, further comprising an atmospheric vent for releasing gases into the atmosphere connected to the off gas cleaning system.

54. The apparatus of claim 51, further comprising a flange joint on the catholyte reservoir to facilitate flushing out the catholyte reservoir.

55. The apparatus of claim 51, further comprising a thermal control unit connected to the catholyte reservoir for varying the temperature of the catholyte portion.

56. The apparatus of claim 51, further comprising a mixer for stirring the catholyte connected to the catholyte reservoir.

57. The apparatus of claim 51, further comprising a catholyte pump for circulating catholyte back to the electrochemical cell connected to the catholyte reservoir.

58. The apparatus of claim 51, further comprising a drain for draining catholyte connected to the catholyte pump.

59. The apparatus of claim 51, further comprising a drain valve connected to the drain.

60. The apparatus of claim 51, further comprising a metal recovery and acid treatment system connected to the catholyte pump.

61. The apparatus of claim 25, further comprising a housing surrounding the electrochemical cell, the electrolyte, and the foraminous basket.

62. The apparatus of claim 61, further comprising a monitor screen connected to the housing for displaying information about treating the biological waste materials.

63. The apparatus of claim 61, further comprising a control keyboard connected to the housing for inputting data for treating the biological waste materials.

64. The apparatus of claim 61, further comprising status lights connected to the housing for displaying information about treating the biological waste materials.

65. The apparatus of claim 61, further comprising an air intake vent connected to the housing for introducing air to an air sparge.

66. The apparatus of claim 61, further comprising an external CO_2 vent connected to the housing for releasing CO_2 into the atmosphere.

67. The apparatus of claim 61, further comprising an external atmospheric vent connected to the housing for releasing gases into the atmosphere.

68. The apparatus of claim 61, further comprising a power cord connected to the housing and to the electrochemical cell for providing power to the electrochemical cell.

69. The apparatus of claim 61, further comprising a flush connected to the housing and the catholyte reservoir for flushing the catholyte reservoir.

70. The apparatus of claim 61, further comprising an external drain connected to the housing for draining the anolyte portion and the catholyte portion.